C., Ill., Md., Nev., N. J., Va., W. Va. 19th, Cal., Colo., Kans., Nev., N. Mex., Utah. 20th, Cal., Ill., Ind., Kans., Ky., Mo., Nev., Ohio, Utah, W. Va. 21st, Ala., Ga., D. C., Ill., Ind., Kans., Ky., Mo., Nev., N. C., Ohio, S. C., Tenn., Utah, Va., W. Va. 22d, Ariz., Colo., Del., D. C., Ind., Kans., Md., Nev., N. J., N. C., Va. 23d, Ariz., Colo., D. C., Kans., Mo., Nev., N. Mex., N. C., Tex., Utah, Va., W. Va. 24th, Ariz., Colo., Ill., Ind., Kans., Nev., N. Mex., Tex., Utah. 25th, Ariz., Ill., Ind., Kans., Mo., N. J., N. Mex., Ohio, Tex., Utah. 26th, Ariz., Colo., Kans., N. Mex., Tex. 27th, Ariz., Col., Kans., Mo., Nev., Utah. 28th, Ariz., Colo., Ill., Ind., Kans., Mo., Nev., N. Mex., Ohio, Tex., Utah. 29th, Ala., Colo., Ill., Ind., Kans., Ky., Md., Miss., N. Mex., N. C., Ohio, S. C., Tenn., Va., W. Va. 30th, Del., D. C., Ill., Ind., Ky., Nev., N. J., N. M., N. C., Ohio, Pa., Va., W. Va. 31st, Del., D. C., Ill., Ky., Md., N. J., N. C., Ohio, Pa., Va., W. Va.

The following are reports of injury to vegetation by frosts during the month:

Ripley, Ohio, 2d: the late heavy frost has been very injurious to the tobacco crop in this section.

Dunkirk, Md.: a heavy frost occurred the night of the 3d–4th, causing damage to tobacco and other outstanding crops.

Boston, Mass., 9th: the frost, rain, and snow of last week caused considerable damage to crops in many places throughout New England.

To the southward of the fortieth parallel frost was most frequently noted in the central valleys; in the south Atlantic states it was reported as far south as the thirty-third parallel; on the central Gulf coast it occurred at New Orleans on five days, while in Texas it was noted as far south as San Antonio, where it occurred on the 24th and 25th. In Arizona frost was reported on seven days; in the middle Sacramento valley on the 19th and 20th, while in northeastern California and southern Oregon its occurrence was frequently noted.

COTTON REGION REPORTS.

The rainfall was about normal in the New Orleans and Vicksburg districts; in Galveston and Little Rock districts the rainfall was about 20 and 40 per cent., respectively, below the average. In all other districts the rainfall was in excess of the average, notably in Savannah and Montgomery districts, where it was more than double the usual amount for the month.

The means of the maximum temperatures were below the average in all districts, the greatest departures occurring in the Atlanta, Wilmington, Memphis, and Montgomery districts, where they exceeded 5°. The means of the minimum temperatures were below the average in all districts, except Galveston, where they were slightly above the average of six years.

In the following table the average rainfall and the means of the maximum and minimum temperatures in the cotton region are given, for October, 1888, together with normals and extreme temperatures obtained from similar observations of the last six years:

Temperature and rainfall data for the cotton districts, October.

District. (The reporting centre for each is named below.)	Rainfall.			Temperature.							
				Maximum.			Minimum.			Extremes at any station in the district for Oct., 1888.	
	Average for Oct. of six preceding years.	Average for Oct., 1888.	Departures.	Mean for Oct. of six preceding years.	Mean for Oct., 1888.	Departures.	Mean for Oct. of six preceding years.	Mean for Oct., 1888.	Departures.	Max.	Min.
	Inches	*Inches*	*Inches.*	°	°	°	°	°	°	°	°
New Orleans..	2.66	2.47	— 0.19	79.4	77.1	— 2.3	57.6	55.5	— 2.1	88	38
Savannah	2.45	5.35	+ 2.90	79.7	78.4	— 1.3	58.4	55.7	— 2.7	92	35
Charleston....	2.49	4.62	+ 2.13	76.7	74.5	— 2.2	54.2	53.3	— 0.9	88	37
Atlanta	2.35	3.88	+ 1.53	74.5	69.0	— 5.5	52.6	48.9	— 3.7	86	30
Wilmington*.	2.98	3.60	+ 0.62	75.1	69.5	— 5.6	52.8	48.2	— 4.6	83	29
Memphis	2.21	2.95	+ 0.74	74.7	69.4	— 5.3	50.9	48.1	— 2.8	83	29
Galveston*...	2.86	2.24	— 0.62	80.1	79.6	— 0.5	58.1	59.0	+ 0.9	92	35
Vicksburg	2.79	2.73	— 0.06	77.6	73.8	— 3.8	55.4	52.3	— 3.1	91	40
Montgomery .	1.66	4.47	+ 2.81	78.2	73.1	— 5.1	58.1	52.7	— 5.4	85	38
Augusta	2.53	4.64	+ 2.11	76.1	71.4	— 4.7	53.3	49.7	— 3.6	84	33
Little Rock...	1.72	0.95	— 0.74	75.9	71.7	— 4.2	50.3	50.3	0.0	89	32
Mobile.....	2.02	3.09	+ 1.07	78.7	75.2	— 3.5	54.2	52.5	— 1.7	89	37

*Normal for five years.

TEMPERATURE OF WATER.

The following table shows the maximum, minimum, and mean water temperature as observed at the harbors of the several stations; the monthly range of water temperature; and the mean temperature of the air for October, 1888:

Stations.	Temperature at bottom.				Mean temperature of air at the station.
	Max.	Min.	Range.	Monthly mean.	
	°	°	°	°	°
Canby, Fort, Wash.....	60.8	53.7	7.1	57.4	55.2
Cedar Keys, Fla	80.0	69.9	10.1	74.5	70.0
Charleston, S. C....	72.8	67.1	5.7	69.7	64.2
Eastport, Me	50.2	47.6	2.6	48.8	43.4
Galveston, Tex	79.0	68.0	11.0	74.6	72.2
Key West, Fla.....	84.0	75.3	8.7	80.1	79.1
New York City	62.9	50.7	12.2	55.7	49.2
Pensacola, Fla	77.0	69.8	7.2	73.8	67.2
Portland, Me	57.1	46.8	10.3	49.8	43.3
Portland, Oregon	65.0	53.0	12.0	60.2	55.5

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for October, 1888, as determined from the reports of about one thousand stations, is exhibited on chart iv. In the table of miscellaneous meteorological data are given, for each Signal Service station, the total precipitation, with the departure from the normal. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above.

From the October chart it will be seen that the monthly rainfall was greatest on the north Pacific coast, where it reached twelve inches; more than eight inches fell in portions of the Canadian Maritime Provinces and northern New England, and from six to eight inches fell in portions of the south Atlantic states, and in southern Louisiana in the vicinity of New Orleans; in the Lake region, and, with the exception of the southern plateau and north Pacific coast, in all districts west of the Mississippi River, less than 75 per cent. of the normal amount of rain fell, that for the lower Missouri and Rio Grande valleys being less than half the normal; in Florida the rainfall averaged about 67 per cent. of the normal; in New England and the middle Atlantic states the rainfall exceeded the average by about 15 per cent., and in the south Atlantic and east Gulf states and on the north Pacific coast 30 per cent. Over a large part of California there was a total absence of rain, and so far as shown by the reports of the Signal Service and voluntary observers but little rain fell in any part of the state. A newspaper report from Campo, however, states that rain began falling there on the evening of the 17th, and continued about forty-eight hours, two and a half inches having fallen up to that time. The average rainfall in California for October, as determined from Signal Service observations, is slightly more than an inch for the northern part of the state, and somewhat less than half an inch for the southern part.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for a series of years; (2) the length of record during which the observations have been taken, and from which the average has been computed; (3) the total precipitation for October, 1888; (4) the departure of the current month from the average;

(5) and the extreme monthly precipitation for October during the period of observation and the years of occurrence:

State and station.	County.	(1) Average for the month of Oct.	(2) Length of record.	(3) Total for Oct., 1888.	(4) Departure from average.	(5) Extreme monthly precipitation for Oct.			
						Greatest.		Least.	
						Am't.	Year.	Am't.	Year.
Arkansas.		*Inches*	*Years*	*Inches*	*Inches.*	*Inches*		*Inches.*	
Lead Hill	Boone	5.04	7	3.10	−1.94	18.11	1883	0.10	1886
California.									67, 68
Sacramento	Sacramento	0.70	22	0.00	−0.70	3.01	1876	0.00	87, 88
Connecticut.									
Southington	Hartford	3.28	19	4.70	+1.42	7.93	1877	0.87	1874
Florida.									
Merritt's Island	Brevard	6.13	11	3.31	−2.82	11.94	1886	1.74	1882
Illinois.									
Aurora	Kane	3.80	10	3.10	−0.70	.....	.....	.....	.....
Golconda	Pope	3.61	11	2.58	−1.03	.....	.....	.....	.....
Peoria	Peoria	2.65	33	2.29	−0.36	5.68	1877	0.70	1860
Riley	McHenry	2.61	28	1.70	−0.91	.....	.....	.....	.....
Sandwich	De Kalb	3.25	38	2.95	−0.30	.....	.....	.....	.....
Indiana.									
Spiceland	Henry	2.48	27	3.91	+1.43	7.02	1884	0.10	1879
Vevay	Switzerland	2.65	22	4.13	+1.48	7.67	1883	0.28	1879
Iowa.									
Cresco	Howard	2.44	16	0.85	−1.59	.....	.....	.....	.....
Independence	Buchanan	3.04	13	2.07	−0.97	6.50	1881	0.90	1876
Monticello	Jones	2.93	35	2.02	−0.91	7.21	1881	0.43	1872
Kansas.									
Independence	Montgomery	2.98	15	3.56	+0.58	7.16	1883	0.75	1874
Lawrence	Douglas	2.89	21	3.74	+0.85	6.96	1870	0.44	1878
Yates Centre	Woodson	3.30	8	1.96	−1.34	8.52	1881	1.16	1886
Louisiana.									
Point Pleasant	Tensas	4.35	13	3.45	−0.90	.....	.....	.....	.....
Maine.									
Gardiner	Kennebec	4.49	50	6.71	+2.22	13.15	1855	0.40	1839
Maryland.									
Cumberland	Alleghany	1.95	17	2.60	+0.65	4.30	1872	0.00	1879
Massachusetts.									
Somerset	Bristol	3.85	18	3.09	−0.76	.....	.....	.....	.....
Newburyport	Essex	3.47	10	5.66	+2.19	6.83	1885	0.81	1886
Michigan.									
Adrian	Lenawee	3.66	11	1.64	−2.02	.....	.....	.....	.....
Thornville	Lapeer	2.97	12	2.79	−0.18	.....	.....	.....	.....
Kalamazoo	Kalamazoo	3.15	13	2.46	−0.69	5.81	1881	1.29	1886
New Jersey.									
South Orange	Essex	3.52	19	5.86	+2.34	7.19	1877	.....	.....
Moorestown	Burlington	3.18	25	4.14	+0.96	6.83	1877	0.47	1879
New York.									
Palermo	Oswego	3.43	35	2.20	−1.23	7.90	1862	0.30	1882
Humphrey	Cattaraugus	3.53	6	4.27	+0.74	4.27	1888	1.55	1886
Ohio.									
North Lewisburg	Champaign	2.15	16	4.85	+2.70	5.45	1881	0.45	1887
Tiffin	Seneca	1.63	4	2.09	+0.46	2.31	1885	0.94	1887
Wauseon	Fulton	2.89	16	1.93	−0.96	8.92	1881	0.93	1874
Oregon.									
Albany	Linn	3.38	10	3.26	−0.12	7.08	1882	0.97	1887
Pennsylvania.									
Dyberry	Wayne	3.11	18	3.97	+0.86	6.55	1881	1.23	1882
Grampian Hills	Clearfield	2.78	19	4.50	+1.72	4.74	1873	0.81	1887
Wellsborough	Tioga	4.65	10	6.69	+2.04	7.50	1885	1.88	1886
South Carolina.									
Statesburgh	Sumter	3.08	8	3.05	−0.03	8.15	1887	0.02	1884
Tennessee.									
Milan	Gibson	2.60	6	3.01	+0.41	4.72	1883	0.90	1886
Texas.									
New Ulm	Austin	4.01	17	3.50	−0.51	12.44	1881	0.79	1874
Vermont.									
Strafford	Orange	3.23	14	4.85	+1.62	5.90	1885	1.20	1882
Virginia.									
Bird's Nest	Northampton	3.26	19	2.21	−1.05	9.25	1872	0.00	1884
Wytheville	Wythe	3.03	24	5.05	+2.02	9.40	1860	0.50	1875

HAIL.

Descriptions of the more severe hail storms of the month are given under "Local storms." In addition to those given under that heading, hail is reported to have fallen in the various states and territorries as follows:

1st, Ill., Ind., Ohio, W. Va. 2d, Ill., N. H., N. Y., Ohio. 3d, Mass., N. Y. 5th, Kans., Mo. 6th, Md. 8th, N. Y., Pa. 9th, Nebr. 11th, Pa. 13th, N. J. 14th, Kans. 15th, Dak., Ill. 16th, N. Y., Pa. 17th, Iowa, Mass., N. J. 18th, Ill., Ind., Mich., Mo. 19th, Conn., Mich. 20th, Mich., Ohio, Pa. 21st, Ind., Iowa, Mo. 22d, Pa. 24th, Me. 26th, Ill., Ind., Mich. 27th, Mich., Wis. 28th, Mich. 29th, Me., Pa. 31st, Me., N. H., Oregon.

SLEET.

Sleet fell during October on the several dates as follows:

2d, N. Y., Vt., Wis. 3d, N. Y., Pa. 7th, Mo. 8th, N. Y. 9th, Vt., W. Va. 11th, Va. 18th, Mich., Ohio. 19th, Dak., Kans., Mich., Minn., Pa., Wis. 20th, N. Y., Ohio, Pa. 21st, Ill., Iowa, Mo., Nebr., N. Y. 22d, Ohio. 24th, Me. 27th, Iowa. 28th, Mich., Ohio. 29th, Minn.

SNOW.

Snow was reported from but few stations southward of the fortieth parallel and eastward of the Rocky Mountains. Northward of that parallel the most general snowfalls of the month were those occurring in the Lake region and northern part of the middle Atlantic states on the 2d and 3d, in New England on the 9th, and from the Missouri Valley eastward to the lower lakes from the 19th to 21st. With the exception of elevated stations the most southerly point reporting snow in October was Worthington, Ind. (latitude about 39° 8′), on the 18th.

MONTHLY SNOWFALLS (in inches and tenths).

The largest monthly snowfalls were those which occurred in northern New England, the upper Michigan peninsula, and in portions of Montana and Colorado, where depths ranging from 4 to 10 were recorded. The largest fall, 10, occurred at East Berkshire, Vt., the next largest being 8 at Mayfield, Me., Calumet, Mich., and Georgetown, Col. In other than the above named districts the monthly snowfalls amounted to less than 1, with the exception of portions of Iowa, Nebraska, Minnesota, Wisconsin, and western New York, where they ranged from 1 to 3.

Snowfalls of one inch, or more, occurred as follows: *Colorado.*—Georgetown, 8. *Dakota.*—Fort Buford, 1.4; Fort Totten, 1. *Iowa.*—Dysart, Osceola, and Vinton, 3; Des Moines and Grinnell, 2; Glenwood and Independence, 1.5; Clarinda and Fayette, 1. *Maine.*—Mayfield, 8; Belfast and Orono, 5; Kent's Hill, 4; Cornish, 3; Gardiner, 2; Bar Harbor, 1. *Massachusetts.*—Dudley, 1. *Michigan.*—Calumet, 8; Marquette, 4.5; Atlantic, 4; Lathrop, 3.8. *Minnesota.*—Red Wing, 2.1; Grand Meadow, 2; Lake Winnibigoshish, Leech Lake, and Pokegama Falls, 1. *Montana.*—Fort Maginnis, 6.1; Helena, 2.5. *Nebraska.*—Valentine, 5; Ashland, 2.3; Crete, 2; North Loup, 1.2; Sargent, 1. *New Hampshire.*—Wolfborough, 4.6; West Milan, 4; Manchester, 1.8; Walpole, 1. *New Mexico.*—Las Vegas, 1.8; Santa Fé, 1. *New York.*—Humphrey, 3. *Ohio.*—Wauseon, 1. *Vermont.*—East Berkshire, 10; Lunenburg and Strafford, 3; Chelsea, 2; Burlington, 1. *Washington Territory.*—Spokane Falls, 1. *Wisconsin.*—Deuster, 2.

But two stations report snow on ground at end of month: Fort Maginnis, Mont., 0.5 inch, and Poplar River, Mont., trace.

EXCESSIVE PRECIPITATION FOR OCTOBER.

The number of stations showing monthly rainfalls amounting to, or exceeding, 10 inches, in October, as compared with those giving similar data for September and the preceding summer months, is decidedly less, and the area of country subjected to same, consequently less extended. This statement, however, does not apply to the north Pacific coast where the normal rainfall for October is more than double that for September, but in that region the area over which the rainfall reaches or exceeds ten inches is confined to a very narrow strip along the coast, north of the forty-fifth parallel. As in previous months these excessive monthly rainfalls have been most frequent in the states bordering on the Atlantic and Gulf, although the records at many of the older established stations in these districts show that no monthly falls reaching the ten-inch limit have occurred, and at but one of the regular Signal Service stations have they been recorded at a greater average frequency than one for a period of six years, viz.: Hatteras, N. C., where three have occurred since 1880, Galveston, Tex., and Mount Washington, N. H., following next in order of frequency with an average of one for each six-year period.

The data for October show that at not more than thirty per cent. of the Signal Service stations to the eastward of the Mississippi River have rainfalls reached ten inches in this month. When it is considered that a majority of these stations have records exceeding fifteen years, in connection with the small number of ten-inch rainfalls recorded, it may be stated that they

are of uncommon occurrence in any part of the country during the month of October. The following are some of the greatest October rainfalls on the records of the Signal Service: Mayport, Fla., 20.03, in 1880; Key West, Fla., 19.77, in 1883; Rabun Gap, Ga., 19.40, in 1879; Mount Washington, N. H., 18.38, in 1881; Lead Hill, Ark., 18.11, in 1883; White Plains, N. Y., 18.09, in 1877. To the westward of the one hundredth meridian no October rainfalls have reached 10 inches with the exception of those occurring on the north Pacific coast and the single instance of 12.95 at Summit, Cal., in 1882. At Fort Robinson, Nebr., 8.60 fell in 1887, this amount being greater than was recorded at any other station on the eastern slope of the Rocky Mountains or in the plateau regions.

While, as above stated, there is a decided diminution in the number of stations reporting excessive monthly rainfalls in October, as compared with previous months, the same cannot be said with respect to excessive daily rainfalls, with the exception, however, of the Lake region and central valleys, where they were somewhat less frequent than in September. In the Gulf and Atlantic coast states, where daily rainfalls of 2.50 inches, or more, have been most numerous, their distribution and frequency for the months of September and October have been much the same. The accompanying table of excessive precipitation shows that since 1870 the maximum number of excessive daily rainfalls occurred during the years 1877 and 1887, and, not considering the period prior to 1876—since which time the number of rainfall stations has been largely increased—the years in which the least number of excessive daily rainfalls was recorded are 1879 and 1886, the number recorded in the former years being more than double that of the latter. The states most subjected to these excessive daily rainfalls are Texas (principally the region along the coast), Florida, and North Carolina. An examination of the records, with reference to dates, shows that the average periods of maximum frequency for the whole series of observation are as follows: 3d–4th, 10–12th, and 17th–23d; the periods of minimum frequency being the 5th–6th, 13–16th, 24–25th, and 30th–31st. Some of the most noteworthy falls are the following: Fernandina, Fla., 13.14, 20th–21st, 1882; Newport, Fla., 8.20, 8th, 1876; Saint Augustine, Fla., 10.31, 9–10th, 1880; Sanford, Fla., 6.09, 10th, 1885; Baton Rouge, La., 6.70, 18th, 1877; Hazlehurst, Miss., 6.00, 17th, 1887; Fort Robinson, Nebr., 7.07, 23d, 1887; Charleston, S. C., 6.15, 20th, 1876; Brackettville, Tex., 13.08, 1st–2d, 1881; Galveston, Tex., 7.77, 2d, 1871; Sour Lake, Tex., 6.80, 13th, 1886.

It will be seen from the table of excessive precipitation that very few rainfalls amounting to one inch per hour have occurred during October in any part of the United States; none were recorded in the region westward of the Rocky Mountains, and in many states to the eastward they have not occurred. From the west Gulf coast northward to the Missouri valley they have been more numerous than in any other part of the country. There are only a few instances in which more than one rainfall of an inch, or more, per hour has occurred at a single station, and in no case have more than two occurred at any one place during the series of observation.

The following table shows some of the heaviest rainfalls of short duration reported, and the rate of fall per hour:

Station.	Year.	Date.	Actual fall.	Duration.	Rate per hour.
			Inches.	*h. m.*	*Inches.*
Des Moines, Iowa	1880	15	2.30	0 30	4.60
Asheville, N. C	1879	17–18	6.40	4 00	1.60
Abilene, Tex	1885	24	1.50	0 25	3.60
Brackettville, Tex	1880	1–2	10.97	8 00	1.37
Galveston, Tex	1877	30	2.12	0 25	5.10
New Ulm, Tex	1879	2	2.38	1 05	2.20
Rio Grande City, Tex	1879	1	1.24	0 35	2.12
Fort Scott, Kans	1881	2	1.80	0 20	5.40
Boonesborough, Iowa	1878	10	1.15	0 30	2.30
Cresco, Iowa	1878	10	1.11	0 20	3.33
Holton, Kans	1883	1	2.50	1 05	2.31
Emory Grove, Md	1878	22	4.00	3 00	1.33
Fort Robinson, Nebr	1887	23	7.07	5 30	1.28

Table showing for the month of October monthly rainfalls of 10 inches, or more (in states where monthly rainfalls did not reach 10 inches the station reporting the maximum amount is given); rainfalls of 2.50 inches, or more, in any 24 consecutive hours; and rainfalls equaling or exceeding one inch in one hour.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
		Inches.			*Inches*			*h. m.*	*Inches*
Alabama.									
Bermuda			1887	19	3.09				
Florence			1887	25	4.00				
Gadsden			1887	20	2.50				
Livingston			1887	18	2.71				
Marion			1887	17	2.78				
Do			1886	15	3.07				
Mobile			1871	3–4	3.07				
Do			1878	9	2.72				
Do			1880	28–29	3.31				
Do			1882	31	5.20	1882	31	1 00	1.04
Montgomery	1879	10.20	1879	17	3.46				
Mount Vernon			1887	19	3.92	1888	25	0 45	1.08
Tuscaloosa			1882	19	3.10				
Arizona.									
Fort Apache	1881	4.68							
Arkansas.									
Fort Smith			1881	1	3.75				
Do			1887	8–9	2.70				
Franklin			1881	1	3.48				
Lead Hill	1883	18.11							
Little Rock			1882	28–29	2.97				
Mount Ida			1883	19	2.70	1883	24	1 00	1.00
California.									
Fort Gaston	1876	12.50							
Summit	1882	12.95							
Colorado.									
Pike's Peak	1880	4.64							
Connecticut.									
Canton	1869	14.70							
Columbia			1875	7	2.56				
Do			1875	30–31	4.10				
New Haven	1877	10.09	1888	6–7	2.61				
New London			1871	12	4.34				
Do			1877	4–5	2.99				
Do			1885	13–14	2.51				
Shelton			1888	6	3.52				
Southington			1877	4–5	3.50				
Dakota.									
Deadwood			1879	15–16	3.47				
Pembina	1878	6.61	1878	1	2.56				
Delaware.									
Delaware Breakwater	1883	5.12							
Dover			1877	3–4	3.30				
District of Columbia.									
Receiving Reservoir	1885	10.88							
Washington City			1872	25	3.12	1875	23	1 00	1.40
Do			1873	19–20	2.86	1877	4	1 00	1.49
Do			1877	4	3.98	1885	29	1 00	1.20
Do			1878	22	3.31				
Florida.									
Biscayne	1874	13.30							
Do	1876	15.30							
Do	1879	14.48							
Cedar Keys	1880	10.37	1880	7–8	3.95				
Do			1880	21–22	3.19				
Do			1882	10–11	2.81				
Daytona			1876	18–20	8.20				
Fernandina	1882	17.17	1882	20–21	13.14				
Do			1883	16	2.84				
Do			1883	17	5.33				
Do			1885	11	2.50				
Fort Barrancas	1879	12.11	1878	10	5.39				
Do			1878	29	2.75				
Do			1879	18	4.53				
Do			1879	27	3.04				
Do			1880	16	3.07				
Do			1880	27	3.62				
Homeland			1881	10	2.90				
Jacksonville	1880	16.25	1872	22–23	5.94	1873	3	0 45	1.00
Do	1882	10.30	1873	3	4.14				
Do			1876	8–9	3.15				
Do			1877	1	3.29				
Do			1880	7–8	4.43				
Do			1880	9–10	4.03				
Do			1882	20–21	3.39				
Do			1882	21–22	3.29				
Do			1883	16–17	4.23				
Do			1885	10–11	2.97				
Key West	1879	14.20	1874	12	2.54				
Do	1883	19.77	1876	19–20	3.75				
Do			1878	20–21	3.97				
Do			1879	12–13	4.22				
Do			1883	20–21	9.24				
Do			1885	9–10	2.60				
Do			1887	8–9	2.73				
Live Oak			1882	11	4.75				
Mayport	1880	20.03	1877	3	6.32				
Do			1885	10–11	4.98				
Merritt's Island	1879	11.30	1878	22	3.00	1885	10	1 05	1.87
Do	1883	11.82	1879	2	2.61				
Do	1886	11.94	1879	6	2.60				
Do			1883	17	3.17				
Do			1883	21	3.70				
Do			1886	11	3.39				
Newport	1876	17.55	1876	7	4.40				

Table showing for the month of October, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
Florida—Continued.		*Inches.*			*Inches*			*h. m.*	*Inches*
Newport			1876	8	8.20				
Do			1876	9	3.00				
Pensacola			1880	16	2.80				
Do			1881	23	2.65				
Saint Augustine	1880	14.29	1880	9–10	10.31				
Do	1882	12.71	1882	20–23	11.54				
Do			1887	15	3.20				
Saint Marks	1877	10.61	1877	1–3	7.28				
Do	1879	12.94	1878	10	3.30				
Sanford			1885	10	6.09				
Do			1886	10–11	3.28				
Tallahassee			1888	10	3.30				
Titusville	1887	12.17	1887	16	3.43	1887	16	1 00	1.00
Do			1887	19	3.92	1887	19	3 12	3.92
Georgia.									
Albany			1882	20	2.50				
Allapaha			1882	21	5.00				
Do			1888	27	3.45				
Augusta			1888	10–11	2.64				
Bainbridge			1887	27	4.30				
Brunswick	1880	12.22							
Ellerslie	1885	10.50							
Jesup	1885	10.02	1882	11	2.78				
Do			1885	11	5.74				
Do			1885	12	3.76				
Do			1888	27	3.45				
Leo	1879	10.05							
Millen			1887	27	3.60				
Oglethorpe Barracks			1877	3	2.56				
Quitman	1876	16.55	1876	7–11	14.25				
Do	1877	13.30	1877	1–3	8.90				
Do			1879	26–27	3.00				
Do			1880	7–8	3.70				
Do			1882	11	2.70				
Rabun Gap	1879	19.40							
Do	1885	11.20							
Saint Mary's			1877	1–2	2.60				
Savannah			1868	4	2.80				
Do			1870	11	3.28				
Do			1872	22–23	2.71				
Do			1876	9–10	3.05				
Do			1876	19–20	3.10				
Do			1877	3	2.93				
Do			1885	11–12	4.82				
Do			1888	10–11	2.77				
Smithville			1887	20	2.80				
Thomasville	1879	13.78	1878	10	4.97				
Do			1879	22	4.40				
Do			1887	19	3.00				
Toccoa			1885	12	2.65				
Union Point			1887	26	4.00				
Way Cross			1882	11	2.72				
Idaho.									
Boisé City	1883	4.06							
Illinois.									
Anna			1877	19	2.88				
Do			1881	9	3.20				
Do			1883	18	2.44				
Atwood			1888	18	3.12				
Cairo			1879	18	2.53	1871	25	0 50	1.10
Do			1883	18	3.07	1880	3	0 50	1.00
Charleston			1881	17	2.50				
Do			1881	28	2.50				
Chicago			1877	19–20	2.55				
Collinsville			1885	19	2.50				
Gibson City			1888	18	2.62				
Lacon			1888	18	2.69				
Mattoon	1881	11.25							
Philo			1888	18	3.60				
Richmond			1888	18	2.79				
Springfield	1881	10.02	1881	3	3.19				
Stephenson			1886	14	2.50				
Sterling			1878	26	3.50				
Swanwick			1881	3	2.65	1881	6	1 45	2.25
Do			1883	28	3.15				
Wyanet			1875	5–6	2.50				
Indiana.									
Arlington						1879	11	1 00	1.00
Clinton	1883	10.06	1883	28	4.50				
Franklin			1883	28	2.92				
Glenwood			1883	28	2.64				
Greencastle	1883	10.22							
Martinsville	1883	11.83	1883	29	3.78				
Mitchell	1883	14.60?	1883	18	3.50				
Richmond			1883	29	3.18				
Rising Sun			1881	3	2.75				
Stablesville			1883	29	3.19				
Terre Haute	1883	10.93							
Vevay						1881	4	0 40	1.20
Indian Territory.									
Fort Reno			1883	17	2.60				
Do			1887	7–8	5.65				
Fort Sill	1886	7.10	1877	14	4.18	1886	20	1 45	1.80
Do			1884	20–21	3.65				
Do			1886	7–8	3.68				
Do			1886	20–21	3.05				
Do			1887	7–8	5.44				
Iowa.									
Amana			1886	13–14	2.74				
Boonesborough						1878	10	0 30	1.15
Clinton			1886	13–14	3.56				

Table showing for the month of October, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
Iowa—Continued.		*Inches.*			*Inches*			*h. m.*	*Inches*
Cresco						1878	10	0 20	1.11
Davenport			1884	6–7	4.12	1887	6	1 05	1.30
Des Moines			1880	15–16	2.82	1880	15	0 30	2.30
Do			1884	7–8	3.72				
Dubuque			1886	13–14	2.69				
Elkader			1886	14	3.25				
Fairfield			1884	6–7	3.40				
Garnavillo			1886	13	3.22				
Hamlin (Audubon P. O.)			1884	1	2.50				
Do			1884	3–4	2.50				
Do			1885	12	2.50				
Manchester			1886	13–14	6.70				
Monticello			1886	22–23	2.59				
Mount Pleasant			1884	6–7	2.90				
Muscatine			1885	19	2.80				
Do			1886	14	3.70				
Nora Springs	1881	11.10				1879	16	1 00	1.50
Urbanna			1886	12	2.65				
Kansas.									
Clay Centre	1882	11.42	1883	16–17	4.71				
Creswell			1878	3	3.00	1878	3	2 00	3.00
Do			1882	7	3.29				
Dodge City						1882	6	1 30	1.50
Fort Larned			1870	29	2.60				
Fort Scott						1881	2	0 20	1.80
Holton			1883	1	2.50	1883	1	1 05	2.50
Leavenworth			1876	31–1[a]	2.81				
Do			1880	2–3	2.56				
Do			1887	7–8	3.10				
Manhattan			1877	3	2.90				
Pretty Prairie			1883	17	3.25	1882	6	2 00	2.00
Salina			1883	4	2.60				
Do			1883	16	2.70				
Sedgwick			1877	2	2.50				
Topeka			1887	7–8	2.92				
Wellington			1882	7	4.18				
Do			1887	7–8	6.06				
Do			1877	24	2.60				
Kentucky.									
Frankfort			1883	28–29	6.17				
Louisville			1876	29	4.12				
Do			1880	15	2.64				
Do			1883	29	2.55				
Paducah	1880	14.39[a]	1880	16	2.92				
Louisiana.									
Amite City			1884	26	3.01				
Do			1887	19	3.65				
Alexandria			1882	18	2.62				
Do			1888	22	2.62				
Baton Rouge	1877	16.75	1877	18	6.70				
Do			1877	26	2.50				
Do			1877	29	2.60				
Cheneyville			1884	26	2.95				
Do			1888	22	2.80				
Clinton			1884	26	2.82				
Do			1888	22	2.50				
Franklin			1884	26	4.08				
Lafayette			1884	26	3.45				
Marksville			1888	21	2.75				
Monroe			1882	18	3.07				
Do			1887	24	2.56				
Natchitoches			1883	20	3.30				
Do			1887	24	2.90				
New Iberia			1884	26	5.81				
New Orleans			1871	2	2.95	1884	21	1 00	1.00
Do			1871	30	3.04	1888	22	1 00	2.00
Do			1877	24–25	2.54				
Do			1877	29–30	3.52				
Do			1887	18–19	3.19				
Do			1888	22	4.13				
Point Pleasant	1880	13.04	1880	3–4	3.01				
Do	1881	13.69	1880	27–30	8.60				
Port Eads			1884	27	3.81				
Shreveport			1872	28	2.71				
Do			1881	23	2.63				
Do			1881	27	3.80				
Do			1882	17	4.10				
Do			1885	25	2.73				
Do			1887	23	2.92				
Thibodeaux			1884	26	3.24				
West Milville			1887	19	3.10				
Whiteville			1884	26	5.31				
Maine.									
Cornish			1886	31	3.41				
Eastport			1881	18	2.76				
Do			1888	7–8	3.04				
Gardiner	1855	13.15	1878	23–24	4.91				
Do	1869	12.67							
Kent's Hill			1886	31	2.62				
Orono			1888	8	3.18				
Oxford	1869	15.10							
Perry	1855	10.50							
Portland			1871	12	2.68				
Do			1873	6–7	3.93				
Do			1878	23–24	2.79				
Do			1880	30–31	2.69				
Do			1886	29–30	2.60				
West Waterville			1878	23–24	6.30				
Williamsburg	1869	15.10							
Maryland.									
Baltimore			1873	20	3.42				

Table showing for the month of October, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
Maryland—Continued.		*Inches.*			*Inches*			*h. m.*	*Inches*
Baltimore			1875	28	2.64				
Do			1877	4	2.74				
Do			1878	23	2.75				
Emmitsburg			1877	4	4.12				
Do			1878	22-23	3.58				
Do			1881	28-29	2.60				
Do			1885	20	2.55				
Emory Grove			1878	22	4.00	1878	22	3 00	4.00
Fallston			1877	4	5.09				
Do			1878	22-23	2.60				
Fort Foote			1872	25	2.65				
Do			1877	5	3.16				
Fort McHenry			1873	19-20	2.74				
Fort Washington			1869	3-4	5.68				
New Market			1877	4	5.14				
Owing's Mills			1877	4	3.61				
Sandy Springs			1877	8	2.50				
Do			1878	22	3.57				
Woodstock College	1885	10.23	1877	4	5.20				
Do			1878	22-23	3.05				
Do			1885	2-3	3.10				
Do			1885	12-13	2.50				
Massachusetts.									
Boston			1871	11-12	4.22				
Do			1875	6-7	2.55				
Do			1877	4-5	4.01				
Do			1878	12-13	3.08				
Fitchburg	1869	13.01							
Fort Independence			1871	11-12	4.68				
Mendon			1678	12	3.00				
Do			1878	23	3.45				
Nantucket			1888	28	2.62				
New Bedford			1877	5	3.40				
Rowe			1877	5	2.55				
Somerset			1877	4-5	3.61				
Do			1878	12	3.01				
Do			1882	14	4.54				
Springfield Armory	1869	13.50	1877	4-5	3.81				
Thatcher's Island			1877	5	3.19				
Do			1878	11	3.78				
Westborough			1878	23	3.05				
Wood's Holl			1877	22	2.63				
Do			1878	12	2.56				
Worcester			1877	4-5	3.20				
Michigan.									
Alpena	1877	13.18	1877	10-11	5.17				
Do	1881	10.25	1881	14-15	3.04				
Escanaba			1884	1-2	3.30				
Grand Haven			1881	16-17	3.05				
Litchfield			1875	5-6	4.50				
Northport	1881	10.17							
Minnesota.									
Duluth	1877	4.92							
Moorhead			1884	4-5	2.57				
Northfield			1881	11	2.84				
Saint Vincent			1878	1	2.56				
Do			1878	15-16	2.61				
Mississippi.									
Biloxi			1887	19	4.60				
Brookhaven			1883	18	4.10				
Corinth			1883	29	2.90				
Edwards			1883	20	3.08				
Fayette			1881	27-28	6.20				
Hazlehurst	1887	10.20	1887	17	6.00				
Do			1887	18	4.00				
Hernando			1883	29	2.67				
Lake			1887	17	2.94				
Natchez	1887	12.73	1869	22-23	6.00				
Do			1887	17-19	10.43				
Port Gibson			1887	18	2.99				
University			1887	24	2.67				
Vicksburg			1877	17-18	2.97	1879	2	0 55	1.25
Do			1880	4	2.71				
Do			1881	27-28	6.59				
Missouri.									
Carthage	1883	11.76							
Hannibal	1881	10.70							
Independence			1879	11	2.72				
Kansas City			1877	19	2.61	1888	4	1 40	2.00
Do			1888	4-5	2.98				
Kirksville	1881	11.30							
Lexington			1880	13	4.32				
Do			1881	1	3.83				
Saint Joseph	1881	11.24	1881	12	3.63				
Do			1881	17	3.60				
Saint Louis			1847	21	4.55	1854	12	1 15	1.35
Do			1858	24	2.95				
Do			1885	18-19	3.14				
Montana.									
Fort Missoula	1882	4.07							
Nebraska.									
Brownsville			1686	22	2.87				
Fort Robinson	1887	8.60	1887	23	7.07	1887	23	5 30	7.07
Howard			1885	10	2.50	1880	13	0 50	1.38
Omaha			1872	28-29	3.46				
Do			1883	16-17	2.72				
Do			1884	3-4	3.66				
Omaha Barracks						1870	17	1 30	2.00
Nevada.									
Winnemucca	1882	1.76							

Table showing for the month of October, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
New Hampshire.		*Inches.*			*Inches*			*h. m.*	*Inches*
Antrim			1880	30-31	2.70				
Auburn	1877	13.15							
Concord	1855	11.00							
Dunbarton	1869	12.83							
Hanover			1843	8	2.95				
Do			1844	3-4	2.85				
Do			1869	3-4	5.88				
North Conway			1888	7	3.28				
Lake Village	1869	11.54							
Mount Washington	1881	18.38	1881	15	2.87				
Do	1884	12.91							
Do	1885	11.11							
Shelburne	1873	12.95							
Weir's Bridge	1869	11.80							
New Jersey.									
Atlantic City			1883	23-24	3.36				
Do			1886	29-30	6.02				
Barnegat City			1877	9	2.83				
Belvidere			1883	29	2.66				
Cape May	1883	8.63							
Hopewell			1888	1	2.50				
Lakewood			1887	21	2.86				
New Brunswick			1888	6	2.74				
Oceanic			1887	21	3.52				
Sandy Hook			1877	4	3.26				
Do			1886	27	3.88				
New Mexico.									
Fort Selden			1888	19	3.81				
Santa Fé	1881	4.19							
New York.									
Ardenia			1866	29-30	5.03				
Buffalo			1881	2	3.10				
Flushing			1877	4	4.75				
Fort Hamilton			1869	3	2.60				
Do			1877	4-5	4.90				
Monticello			1886	22-23	2.59				
Moriches			1875	6-7	3.00				
Do			1877	4	3.90				
Do			1877	9	2.92				
New York City			1873	20	3.01	1877	4	1 00	1.50
Do			1877	6-7	4.32				
Do			1877	4	4.05				
Do			1886	26-27	2.75				
Oswego			1878	23	2.68				
Pelham Manor	1877	10.43	1877	4	5.02				
Do			1877	8-9	3.26				
Rochester			1873	20	3.77				
Setauket			1885	3	2.59				
Troy	1869	13.80							
West Point			1877	4	2.68				
White Plains	1877	18.09	1877	8-9	9.70				
North Carolina.									
Asheville			1879	17-18	6.40	1879	17-8	4 00	6.40
Cape Lookout			1878	11	3.30				
Do			1878	22	4.06				
Do			1880	9	3.82				
Charlotte			1882	19-20	2.64				
Do			1885	12	2.82				
Do			1888	10-11	2.58				
Chapel Hill	1887	11.21							
Elsworth			1880	28-29	6.30				
Flat Rock	1885	12.85	1885	28	3.84				
Do			1885	12	4.11				
Fort Macon			1882	11-12	5.26				
Do			1885	12	2.63				
Franklin	1879	11.40	1879	16-18	7.00				
Goldsborough			1885	12	2.95				
Do			1887	31	2.75				
Hatteras	1880	12.00	1875	14	5.30				
Do	1885	10.28	1876	20-21	5.45	1876	20	2 15	2.86
Do	1887	11.07	1878	11	3.95	1882	11	2 00	2.05
Do			1878	22	3.10				
Do			1879	28	3.13				
Do			1880	9	4.40				
Do			1882	11	4.66				
Do			1885	28-29	3.47				
Do			1887	30-31	3.94				
Highlands	1879	15.83	1879	17-20	11.59				
Do	1881	10.83	1881	29-30	8.27				
Lincolnton			1885	20	2.50				
Lumberton			1885	12	3.73				
Do			1887	18	4.20				
Murphy			1879	16-18	4.30				
New River Inlet			1885	12	2.98				
Do			1885	29	2.87				
Portsmouth			1878	11	3.26				
Do			1878	22	3.48				
Do			1882	11-12	5.70				
Do			1883	29	2.50				
Raleigh			1885	12	2.75				
Do	1887	10.23	1887	31-1[a]	4.52				
Reidsville	1885	29.09?	1885	2	4.00?	1885	20	4 30	6.00?
Do			1885	11	4.00?				
Do			1885	19	4.06?				
Do			1885	20	6.00?				
Do			1885	28	6.00?				
Salisbury	1881	14.19							
Southport	1876	10.05	1876	22	3.90				
Do			1878	11	2.67				
Do			1878	22	4.39				
Do			1880	29	2.51				

Table showing for the month of October, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
		Inches.			Inches			h. m.	Inches
North Carolina—Continued.									
Southport			1882	11-12	7.38				
Statesville			1888	10-11	2.62				
Webster			1879	16-18	6.70				
Weldon			1887	30-31	3.41				
Wilmington			1872	23	2.77				
Do			1876	19	3.80				
Do			1878	23	3.16				
Do			1880	29	2.76				
Do			1882	10	4.20				
Do			1885	11	4.51				
Do			1888	10-11	2.84				
Ohio.									
Cincinnati			1876	22-23	2.64				
Do			1883	28-29	3.06				
Columbus			1881	1-2	3.49				
Portsmouth			1837	26	2.90				
Toledo			1881	2	3.10	1881	8	1 26	1.52
West Milton	1888	10.00	1888	18	3.00				
Oregon.									
Astoria	1875	13.38	1875	20	3.33				
Do	1876	14.20	1875	30	2.63				
Bandon			1886	14	2.65				
Fort Stevens	1875	14.13							
Do	1876	11.66							
Do	1881	11.59							
Do	1882	10.98							
Portland	1876	10.53							
Do	1882	11.63	1882	9-10	2.93				
Pennsylvania.									
Blooming Grove			1881	2	2.90				
Do			1885	20	3.10				
Carlisle	1863	13.10	1863	16	3.80				
Do			1863	23-24	3.00				
Do			1866	13	2.60				
Do			1878	22-23	4.00				
Hulmeville			1877	4	3.60				
Mahanoy Plane			1885	21	2.60				
Mount Pleasant			1884	6-7	2.90				
Newtown			1840	29	2.64				
Philadelphia	1833	10.05	1872	25-26	3.70				
Do			1873	19-20	3.14				
Do			1877	4	2.73				
Troy			1885	21	3.17				
Wellsborough			1888	5-6	2.98				
West Chester			1877	4	5.00				
Williamsport			1877	4	2.95				
Wysox			1885	20	3.00				
Rhode Island.									
Block Island			1880	22-23	2.56				
Do			1883	23-24	2.67				
Do			1885	13-14	2.62				
Fort Adams			1870	20	2.50				
Do			1877	5-6	2.90				
Narragansett	1883	8.14							
Newport			1878	12	3.11				
Do			1878	13	3.31				
Do			1882	14	2.95				
South Carolina.									
Allendale			1887	20	3.35				
Blackville			1887	20	3.34				
Cedar Springs			1888	27	2.55				
Charleston	1576	14.32	1872	22-23	3.43	1879	11	0 30	1.00
Do			1876	20	6.15				
Do			1880	8	3.75				
Do			1882	11-12	4.17				
Do			1885	11-12	5.00				
Cheraw	1887	10.11	1887	18	3.00				
Columbia			1887	17-18	2.77				
Florence			1887	18	2.97				
Hilton Head			1862	9	2.85				
Jacksonborough			1882	21	3.00				
Do			1885	11	3.50				
Kirkwood			1887	17	2.54				
Saint Matthews			1887	20	2.68				
Statesburgh			1887	17-18	2.50				
Tennessee.									
Bolivar	1883	12.09							
Brownsville			1883	18	3.03				
Chattanooga			1888	25-26	2.51				
Fostoria			1888	26	3.00				
Grand Junction			1883	29	5.00				
Knoxville			1885	28-29	2.89				
Memphis			1883	3-4	4.33				
Paris			1884	1	2.88				
Trenton	1883	12.83							
Texas.									
Abilene						1885	24	0 25	1.50
Austin	1870	12.44	1870	15-18	12.28				
Do			1888	21	4.00				
Barnesville			1883	12	2.50				
Belmont Farm	1877	12.00	1871	?	3.00				
Do			1879	2-3	4.50				
Brenham			1887	24	2.75				
Brownsville	1884	15.71	1877	17	3.08				
Do	1887	16.27	1879	26-27	2.58	1877	17	2 10	2.28
Do			1884	23	3.02	1884	23	0 06	1.20
Do			1884	24	3.54				
Do			1884	27-28	4.86				

Table showing for the month of October, &c.—Continued.

States and stations.	Rainfall of 10 inches, or more, per month.		Rainfall of 2.50 inches, or more, in 24 hours.			Rainfall equaling or exceeding one inch per hour.			
	Year.	Amt.	Year.	Day.	Amt.	Year.	Day.	Time.	Amt.
		Inches.			Inches			h. m.	Inches
Texas—Continued.									
Brownsville			1885	8	4.31				
Do			1887	21	4.28				
Do			1887	10-11	6.09				
Brackettville	1881	16.17	1881	1-2	13.08				
Do						1881	1-2	8 00	10.97
Clarksville	1883	10.13	1881	27	2.75				
Do			1883	10	3.25	1883	9	1 10	1.51
Corsicana			1887	8	2.50				
Cuero			1887	8	3.60				
Dallas			1882	16	4.05				
Denison	1877	10.74	1877	14	4.00				
Do			1881	1	2.82				
Eagle Pass			1881	1	3.18				
Edinburg	1881	10.54							
Fort Brown	1884	10.17	1871	26	3.60				
Do			1879	26-27	2.85	1871	26	3 00	3.60
Do			1884	26-27	5.00				
Do			1885	10	5.65				
Fort Concho						1883	4	1 30	2.26
Fort Davis			1879	10-11	3.86				
Do			1881	9	2.82				
Fort Elliott			1883	16-17	2.62				
Do			1886	20-21	2.97	1882	2	1 00	1.40
Galveston	1871	17.78	1871	2	7.77	1877	30	0 25	2.12
Do	1877	17.39	1871	29-30	7.92				
Do	1881	10.38	1877	24	5.53				
Do			1877	25	3.99				
Do			1878	26	2.93				
Do			1881	23	3.04				
Do			1882	18	2.59				
Do			1883	24	4.17				
Do			1884	25-26	5.12				
Do			1887	18	3.21				
Do			1888	22	3.04				
Houston			1884	26	3.16				
Indianola	1877	11.75	1877	16	4.11				
Do			1877	30	3.24				
Do			1879	3	4.71				
Jacksborough			1880	2	4.12				
Laredo			1881	8	3.53				
Longview	1885	10.23	1885	18	3.97				
Do			1885	25-26	6.10				
Do			1887	24	2.60				
Mesquite			1871		3.50				
New Ulm	1877	11.31	1888	21	2.51	1879	2	1 05	2.38
Do	1881	12.44							
Orange			1887	18	3.75				
Palestine			1882	17-18	4.59				
Do			1887	24	2.60				
Pilot Point	1877	10.42							
Rio Grande City						1879	1	0 35	1.24
San Antonio			1883	24	2.96	1882	8	1 10	1.70
Sour Lake			1886	13	6.80				
Do			1888	22	3.00				
Utah.									
Kanab			1876	13	2.50				
Salt Lake City	1876	3.27							
Vermont.									
Charlotte	1869	11.40							
Craftsbury	1869	10.72							
Newport			1885	21	3.11				
Strafford			1885	21	2.60				
Virginia.									
Accotink			1877	4	4.00				
Cape Henry			1882	24	2.68				
Dale Enterprise	1885	12.60	1885	12	3.14				
Do			1885	20-21	2.88				
Do			1885	28-29	4.75				
Dover Mines			1878	22-23	3.80				
Fort Monroe			1860	20	2.50				
Fort Myer			1877	4	4.30				
Keswick			1878	23	3.50				
Lynchburgh			1877	3	5.43				
Do			1885	29	2.77				
Mount Solon			1877	3-4	3.50				
Norfolk			1872	23-24	3.77				
Do			1872	24-25	3.62				
Do			1878	22-23	3.31				
Variety Mills	1885	10.76	1885	12-13	4.00				
Do			1885	28-29	4.02				
Woodlawn			1877	4	4.00				
Do			1878	22-23	2.50				
Wytheville			1888	27	2.55				
Washington.									
Neah Bay	1884	10.65							
Do	1887	14.84	1887	27	5.77				
Tatoosh Island	1887	11.83	1887	26-27	4.54				
Do	1888	12.12	1888	27-28	2.74				
West Virginia.									
Morgantown	1873	5.76							
Wisconsin.									
Cadiz			1888	26	2.50				
Green Bay			1887	13-14	2.72				
Madison	1881	9.12							
Wyoming.									
Cheyenne	1877	1.99							

* November 1.

WINDS.

The most frequent directions of the wind during October, 1888, are shown on chart ii by arrows flying with the wind. On the Atlantic coast from Virginia northward the prevailing winds were northwest; on the south Atlantic and Florida coasts they were variable; on the east Gulf coast, northerly, and on the west Gulf coast, southerly. In the lower lake region south to west winds were most frequently noted; in the Ohio Valley they were variable; in Tennessee, north to west; in the Mississippi Valley, variable. Along the southern slope of the Rocky Mountains the winds were mostly southerly; over the middle slope, westerly; and over the northern slope, northwesterly. In the plateau regions the winds were generally westerly, while on the Pacific coast they were west to south on the southern slope, north to west on the middle slope, and south to southwest on the northern slope.

HIGH WINDS (in miles per hour).

No maximum velocities of fifty miles, or more, per hour, other than those given in the table of miscellaneous meteorological data, have been reported, except at Fort Buford, Dak., 54, nw., 18th, and at Tatoosh Island, Wash., 54, nw., 23d.

LOCAL STORMS.

1st. *Ohio.*—Newark: a severe wind and rain storm occurred in the afternoon, doing much damage to buildings and trees.

2d. *Georgia.*—Columbus: Mr. W. S. Kennedy, of this place, makes the following report through Mr. H. M. Ayer: "October 2d, a disturbance of great grandeur and awful force was observed in the cloud regions; its effect at the earth's surface being noticeable only as tremulous and jarring sounds resulting from heavy electrical discharges. The only portion of the horizon obscured was directly under the formation, where a pillar of lead color was encompassed by a massive cloud-bank of great density; to the left of which were dark-brownish, drab clouds. Above these were gray, billowy, curled, crumpled clouds, which seemed to be continually curling and rolling themselves into each other, and pushing closer towards the cylindrical shaft, which contracted near the centre and opened out like a funnel at the top, as if impelled by some great centrifugal force. The velocity of the wind within the cylinder I judged to be terrific. The height above ground of the disturbance was about 45°, and the distance from my point of observation one mile or more. The pillar assumed the hour-glass contraction, and seemed to tend upwards instead of downwards, as the opposing currents of air seemed to strike near the bottom of the formation, blend, and assume the twirl of an auger, and push for the contraction and towards the top. The motion of the pillar was something like the action of a balloon, ever upwards, and swaying from side to side. At times it seemed as if completely suspended and to lose its motion. What I should call the tail was composed of lights which streamed straight out for miles to the southward. A few drops of rain fell before and but little afterwards. The day opened clear and bright; towards noon the sky was hazy, and a heaviness and humidity was observable; about 3 p. m. clouds were seen congregating and drifting from northeast to west; about 3.30 p. m. (ninetieth meridian time) they were seen to assemble in the northwest and drift to west, being impelled by a brisk wind, and gaining momentum as they approached the place where they concentrated and formed the phenomenon above described. The formation was dispelled by a loud burst of thunder." *Ohio.*—Cedarville: a severe wind storm occurred about 5 p. m., unroofing buildings, blowing down trees, &c.

19th. *Maryland.*—Utica Mills: Mr. G. F. Mills reports: "This section was visited by a violent tornado, doing considerable damage eight miles south of this place; it unroofed houses, uprooted trees, and blew down fences. Direction of movement was from west to east; width of path of greatest destruction, 1,500 yards; width of storm twelve miles; rain commenced 6.05 p. m. and ended 6.20 p. m.; total fall, .50 inch. The storm was attended by electrical manifestations." *New York.*—Middletown: a destructive wind and rain storm, accompanied by vivid lightning, passed over this section about 5.45 p. m.; fencing, trees, and crops were much injured.

22d. *Louisiana.*—Whitney Plantation, Saint John Baptist Parish: Mr. G. H. Tassin reports: "At 4.35 a. m., New Orleans time, a storm swept the whole depth of this plantation (two miles), which is about fifty miles above New Orleans. It moved from south to northeast, and, on striking the Mississippi levee, ascended, and again struck the ground on the other side of the river. This was a very powerful and destructive disturbance, and although the width of the path did not appear to be over three hundred feet, two persons were probably fatally injured; two mules were killed by flying splinters, and out-buildings were demolished. No rain had fallen for thirty-two days previous to the storm, and during the week preceding it the weather had been very warm, the thermometer reaching 86° at 11 p. m. for three consecutive days. After the passage of the storm we had quite a severe hail storm, but the hail did not fall to the west of the path. Directly after the hail, rain poured down in heavy drops for twenty minutes, then it ceased to start again and continued to fall very heavily for about an hour. The storm kept almost all the débris within its path, more particularly on the west side, and it is not known what became of all the lumber that made up the buildings destoyed. Our loss, comprising stock, buildings, and hay crop, is not less than $3,000. The path of this storm was almost parallel with, and about five hundred feet distant from, that of the terrible storm of November 22, 1884."

WATER-SPOUTS.

Captain J. McFarlin, of the s. s. "Stroma," observed a water-spout October 7th, 4 p. m., in N. 39°, W. 68°, traveling from wnw. to ese., with wind from sse., force 8. Captain McIntosh, of the ship "Steinvora," reports a water-spout October 14th, 5 p. m., in N. 39°, W. 71°, moving slowly se., with wind nw. hauling to ne., and increasing from force 2 to force 7, and barometer steady. On the same day, at 5 p. m., Captain Blake, of the schr. "Cox and Green," observed a water-spout about twenty miles off Fire Island, moving sw., wind calm before, and ne. force 6 after, its appearance. Captain A. McKay, of the s. s. "Pavonia," reports a water-spout October 19th, 11.30 a. m., in N. 51°, W. 10°, moving w., with slowly rising barometer, and wind sse., force 6. Captain Chambers, of the brig "Bessie May," observed a water-spout October 22d, 2 p. m., in N. 32°, W. 74°, moving s., with wind ne., force 4. The captain of the s. s. "Aguan," reports a water-spout October 25th, 10.30 a. m., in N. 19°, W. 76°, moving wsw., with wind e., force 4.

Captain Legoe, of the s. s. "Pomona," reports water-spouts as follows: "October 16th, 6.15 a. m., Cape Morant Point, Jamaica, sw., eighty miles, saw a very large water-spout, traveling rapidly toward the wsw., about one-fourth of a mile from the ship. October 20th, 5 p. m., in N. 33° 47′, W. 74° 49′, saw a water-spout bearing nw., going to the ne., wind sw., squalls, with lightning and light rain; at 10 p. m. wind came out of nw. in heavy squalls."

INLAND NAVIGATION.

STAGE OF WATER IN RIVERS AND HARBORS.

Toledo, Ohio: 1st, during the high southwesterly wind in the morning, the water in the Maumee River fell rapidly, and many vessels were aground.

Nashville, Tenn.: navigation on the upper and lower Cumberland River is now practicable; the first large steamer made a trip up the river, and two large boats, the first ones of the season, came up from the Ohio River on the 23d.